

# THE ZOOLOGIST

No. 753.—March, 1904.

## NOTES ON THE BIRDS FOUND ON THE COAST OF SOMERSET.

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A WORK on the birds which inhabit the waters and coasts of the Bristol Channel and the estuary of the River Severn, similar to that by the late John Cordeaux, which dealt with the district around the mouth of the Humber, would, I think, be welcomed by ornithologists.

Such a work would be interesting for several reasons. Students of bird migration seem to be agreed that a well-marked line of flight extends across England from the Wash to the mouth of the River Severn. We find, however, in the Bristol Channel, that there are many birds, especially Waders, which seem to be more numerous on the mud-flats around Cardiff and Burnham than they are on the tempting-looking stretches of mud and sand above the Severn Tunnel. This seems to indicate that many species, such as Knots, Grey Plovers, and Turnstones, do not visit the Bristol Channel by the overland route, but come perhaps by way of the shores of the English Channel or the Irish Sea.

If a competent ornithologist were to study the Bristol Channel district as a whole he would perhaps be able to solve many interesting problems with regard to the distribution and migrations of birds in our islands. No such work, as far as I am aware, has yet appeared. In 'The Birds of Devon,' by Messrs. D'Urban

and Mathew, the authors have given a very comprehensive account of the avifauna of the south-western peninsula of England. This work, however, does not claim to deal with the south coast of Wales, and it seems likely that this coast has an important influence on the migration of birds when passing across central England on their journey to Ireland.

In drawing up the following sketch of the birds to be found on the Somerset coast, it has been my intention to give just a small contribution to our knowledge of the avifauna of the Bristol Channel district. I have rambled at all seasons of the year along the greater part of the Somerset coast-line, and with parts of it, especially in the neighbourhoods of Weston-super-Mare and Burnham, I am very familiar. These notes are chiefly from personal observation made during the last six years with the aid of a pair of prism binoculars, but I have also taken account of notes and correspondence from various friends and capable ornithologists, and have paid some heed to information given by local fishermen and gunners, a class of men who, with a little more knowledge of the various species, could give very valuable help. In the main, then, this sketch may be considered the result of personal field work during those portions of the last six years when I had the opportunity or the leisure to indulge in it.

It seems expedient here to give a general idea of the geography of this coast district. The Somerset coast-line from the mouth of the River Avon at Bristol to Glenthorne, a few miles to the west of Porlock Bay, is some seventy miles in extent, and presents a variety of natural features which affect the distribution of the birds which inhabit it. Beginning in the north, we find the flat land and the mud-reaches at the mouth of the Avon soon giving place to a steep but not very lofty face of cliff from Portishead to Clevedon; thence southwards for four miles, to the rocky headland known as Swallow Point, we find extensive mud-flats bordering a low marshy coast, from which the sea is kept back by artificial embankments. From Swallow Point the coast takes two bold sweeps, forming Sand Bay and Weston Bay, bounded respectively on their southern sides by those outlying spurs of the Mendips known as Worlebury Camp and Brean Down. In each of these bays very extensive mud-flats are laid bare at low tide, the water ebbing to a distance of over a mile, and each



display a fine stretch of sand about high-water mark, the former presenting a line of low sandhills to the advancing tide, the latter, for some two miles of its length, the artificial sea-front of the growing town of Weston-super-Mare.

We have so far passed the muddy estuaries of several streams and rivers flowing into the Channel, the most important being those of the Yeo and Axe. All these during the highest tides are like little inland arms of the sea, filled to overflowing with muddy brown water, but at lowest ebb their appearance is entirely changed. We see then, many feet below us, a tiny stream trickling between deep sloping banks of slimy ooze, in which a man may sink to his knees, or in places even deeper; while down the sides of these banks are little runnels, locally known as "pills," cutting their way deep into the soft muddy slopes.

From Brean Down, a bold promontory, over a mile long and some 320 ft. in height, presenting some fine cliffs on its southern face, the grassy slopes above which are plentifully sprinkled in early summer with the flowers of *Helianthemum polifolium* and *Hippocratea comosa*, the coast runs south to the junction of the Rivers Brue and Parrett, and then turns westward, forming the curve known as Bridgewater Bay. This forms the seaboard of the great central level of Somerset, and from Brean to Burnham it is faced by a lofty and broad range of sandhills, which keep back the water from the low-lying pastures and moors of the interior. Just south of Burnham the River Brue joins the wide and muddy estuary of the Parrett, and together they wind out into the Channel between the Berrow and Steart Flats, the widest expanses of mud and ooze found on the Somerset coast. Opposite Burnham the combined rivers pass the low-lying Steart Island, and when crossing the bar skirt a bank known as the Gore Sand, which is only covered by the high spring tides. This bay, with its fine stretch of sand and high dunes at Brean and Berrow, its ridges of shingle, extensive mud-flats, and oozy estuaries, and warm shallow waters, bordering, as it does, the large alluvial flats of mid-Somerset, is probably the most interesting bird resort on the whole of the Somerset coast.

From Clevedon to the west end of the Steart mud-flats the coast has, with the exception of the three headlands of Swallow Point, Worlebury, and Brean Down, been flat, sandy, or muddy;

but as we go west we leave behind the large stretches of mud, and find the coast bounded with a line of cliffs—in some places steep and firm, in others sloping and crumbling. We get breaks in this line of cliff at Minehead Warren and Porlock Bay, but on the whole the coast from a few miles east of Quantoxhead to Glenthorne is the steepest and rockiest in the county. At the foot of the cliffs is a beach of large rounded boulders, and at low water there is a certain amount of mud and weed-covered rocks, but the sea does not here retire to any great distance.

As we proceed along the western part of the coast the scenery becomes, from a picturesque point of view, more interesting. The strata of the crumbling and water-worn cliffs attract the attention of the geologist. Little sheltered nooks, gay in spring with primroses and many other flowers, meet the wanderer on the shore as he turns the various low headlands jutting to the north, and in places, such as at St. Audrie's and to the west of Porlock Bay, the slopes are well-wooded almost to the water's edge. The bold outline of the North Hill at Minehead, backed by Dunkery Beacon, and thrusting out its rocky promontory of Hurlstone Point into the sea, is perhaps the most striking feature on this part of the coast. The sea here has lost much of its muddy appearance, and further west, where it is still clearer, many little streams rising in the northern face of Exmoor have in the course of ages cut deep combes through the crumbling cliff, and these, now well-wooded and clad in a wealth of low vegetation and undergrowth, offering a sanctuary to the forest deer, can hardly be surpassed for picturesqueness in any part of the seaboard of the West of England. Behind this West Somerset coast lie the hilly regions of the Quantocks, the Brendon Hills, the high ground around Dunkery Beacon, and the rolling moors of Exmoor Forest.

From the above description the naturalist will see that the coast of Somerset presents a variety of attractive features to the species of birds which haunt the sea-shores. The waters of the bays around Weston are warm and shallow, and are visited in winter by shoals of Sprats. The clearer waters in the west offer a pleasanter feeding ground for those species of birds which find the opaque water higher up the Channel distasteful to them. The cliffs, with their nooks and crannies, the ridges of shingle

and sandy dunes, present attractive breeding quarters ; while the vast mud-flats, oozy estuaries, and firm stretches of sand, bordering, as they often do, low-lying swampy out-marshes and flooded pastures, offer the most tempting feeding grounds to a great variety of coast-frequenting birds.

In dealing with the birds to be found on this coast, I do not propose to give an exhaustive account of all the species which from time to time have been obtained. It is rather my object to give a sketch of those kinds which a field naturalist may expect to meet with when rambling along the shores of Somerset. It is hoped also that the account may be of some interest when compared with those relating to neighbouring counties.

Starting with the order *Passeres*, we find all the commoner Thrushes represented. The wet water-meadows offer them attractive feeding grounds at certain seasons, and Mistle-Thrushes, Redwings, and Fieldfares roam over them in flocks in autumn and winter. The Ring-Ouzel appears regularly in April and September on Brean Down and elsewhere on its way to and from its breeding haunts on Exmoor. The Wheatear finds several suitable nesting quarters, especially among the sandhills at Berrow, and the Stonechat is a common resident wherever it can find the gorse and thick bushes it loves to haunt. The Whinchat, so far as my experience goes, is not often met with near the coast. The Black Redstart often occurs in autumn and winter, and is probably much more regular than the casual observer may think. The Nightingale is not a common bird in Somerset, but I have often heard it singing near the coast, sometimes nearly as far west as Quantoxhead. This bird, I think, is yearly spreading westward. Last year it reached Dunster, and it may soon be expected at Minehead and Porlock.

The families of the Warblers and Titmice can in no sense be called shore-birds, but as in parts of Somerset the trees hang just above the waves, the notes of these birds may often be heard during a ramble along the shore. Thus the Wood Wren is common in summer between Porlock and Glenthorne, and I have heard the Grasshopper-Warbler and the Lesser Whitethroat singing so close to the waves that the bushes they were in must at times be splashed by the spray. The latter bird I have found to be rather common on the Burnham Level, and I have noticed

it nearly as far west as Porlock. The rushy ditches or "rhines" of the Somerset Level, and the ballast-pits by the sides of the Great Western Railway which crosses it, are much frequented by Reed- and Sedge-Warblers. Even the rare Marsh-Warbler, as is now well known, is a frequent summer visitor to parts of the county, especially to the neighbourhoods of Bath, Glastonbury, and Taunton. I feel pretty confident that careful search in suitable spots on the low-lying lands near the coast would be rewarded by the discovery of fresh breeding haunts of this rare species. The nest has on one occasion at least been taken near Clevedon. The Dipper and Grey Wagtail breed plentifully by the clear Trout-streams in the Exmoor district, while the White Wagtail (*M. alba*) occurs in small numbers all along the coast in April and again in autumn, but does not make a long stay. The Rock-Pipit, a characteristic shore-bird, is resident in all suitable localities. I have seen the Red-backed Shrike in summer in widely separated districts near the coast, and the bird is well known in the county, visiting regularly certain favourite haunts year after year; and occasionally the Pied Flycatcher may be seen, chiefly as a passing migrant. This species has, however, quite recently been found nesting near Bristol, and a pair or two probably breed on the wooded banks of some of the streams in the west, where it has been noticed in the summer months.

Parties of Finches and Buntings, sometimes of considerable size, may be seen near the coast in autumn and winter, searching for the seeds of weeds among the sandhills and on the out-marshes. These flocks usually consist of Greenfinches, Chaffinches, Linnets, and Yellowhammers, though Goldfinches and Bramblings are not unfrequently to be met with, and even Twites have occurred. A cold spell of weather is pretty sure to bring in small parties of Snow-Buntings, and I have seen these charming birds and listened to their tinkling notes on the frozen foreshore near Burnham. The Lesser Redpoll has of late years been found breeding rather plentifully in parts of Somerset (cf. Zool. 1902, p. 66), but the parties seen in winter prefer the alders by the streams and on the peat-moors to the vicinity of the coast. Siskins also are not uncommon winter visitors to similar haunts. I have found the Cirl-Bunting by no means uncommon in the breeding season near Weston-super-Mare, and

fancy that at that time they prefer the neighbourhood of the sea. In winter they join the parties of other Buntings and Finches. The Reed-Bunting is abundant by some of the "rhines" on the levels, but the Corn-Bunting is rather local, though by no means rare. The Crossbill is only a casual visitor in late summer and autumn. Numbers visited the county in the autumn of 1898, and I saw some on Worlebury Camp, and also rather large parties in the Horner Valley, feeding on the seeds of the mountain-ash, or "quick-beam," as the tree is called in the West Country. The birds were very skilful at extracting these seeds. Some clusters on which I had seen them engaged I afterwards examined, and found the fruit neatly cut down the middle so as to disclose the seeds, but not severed from the stalk.

Starlings, which sometimes appear in the autumn in vast flocks of almost incredible size, nest freely in the sea-cliffs, especially in the west, and numbers of Jackdaws also inhabit these cliffs, where they often place their nests in Rabbit-holes. The Magpie and Jay are common where game-preserving is not too strictly carried on. Many pairs of both species breed on Worlebury Camp, where I have sometimes seen so many Jays together that the assembly might almost be termed a "flock."

The Raven has at least four strongholds at the present time on the coast, but I do not think it advisable to give precise localities. One of these haunts which I know well has been tenanted from time immemorial, and the birds are a source of much pleasure to bird-lovers in the early spring. It is still, I am happy to say, no uncommon sight to see Ravens and also Buzzards in the autumn soaring over the wilds of Exmoor.\*

More than thirty years ago the Chough used to breed in the West Somerset cliffs, but I fear that now it is only a very casual visitor, as is also the Hooded Crow. This latter species abounds on the east coast of England in autumn and winter, but it seems that they turn southwards before reaching the western counties. Whatever the reason may be, the bird is very rarely seen in Somerset.

A few Carrion-Crows breed on the sea-cliffs, and many more

\* About thirty years ago Ravens seem to have been very common in West Somerset, for, according to an old keeper's record, fifty-two were shot or trapped on Exmoor Forest in a single year.—F. L. B.

inland, where in some localities they are almost abundant. Rooks are very fond of visiting the sea-shore in search of food, and in the autumn and winter large parties of Sky-Larks frequent the out-marshes and the sands, where they seem to find much to their taste among the *débris* washed up by the tides. As far as my own experience goes, the Wood-Lark is a rare bird in Somerset. I have found it in the breeding season near Porlock and Oare, but nowhere else. Doubtless this is a species which is often overlooked.

The Wryneck seems to be a local bird, but not uncommon in some places, while in the woods near the sea the three Wood-peckers and the Nightjar may be found breeding. The Tawny Owl and a few Long-eared Owls also breed in thick plantations, and the Short-eared Owl is found in autumn and winter on the central level. In winter I have often seen the Kingfisher on the sea-coast, and they breed in the banks of some of the "rhines."

In times past the three Harriers bred on Exmoor, and on the Somerset levels, but it is doubtful if any have done so during the last twenty years. It is said that the shepherds on Exmoor used to destroy all the nests they found by stamping upon the eggs! Harriers are still occasionally seen in autumn and winter.

There are still two eyries of the Common Buzzard upon the coast, and a few pairs nest inland in the west. I have seen the young birds in the nest, and have frequently (while riding or walking on Exmoor) watched the old ones soaring overhead, and uttering their plaintive mewing cries. The Kite, once a resident in the west, is now a bird of the past. I have good evidence that a pair nested near the River Barle below Withypool about the year 1850. Only one eyrie of the Peregrine Falcon is known to me within the county boundary, but this is inhabited yearly, and birds of this species are not unfrequently seen on the coast in autumn and winter. The Merlin haunts Exmoor, where possibly a pair or two breed, but the Hobby is only a very rare summer visitor to some of the largest woods. The Kestrel nests on the sea-cliffs, particularly in the west, and during a ramble I have found three pairs in close proximity.

The Cormorant, Shag, and Gannet are chiefly wanderers to the Somerset coast, but the first mentioned bird is not uncommonly seen, and haunts the Steep Holm, an island in the

Channel. A few small heronries are left in the county, and so "Cranes," as the birds are called locally, may often be seen wading about near the muddy estuaries; and Bitterns are occasionally shot on the frozen marshes during hard winters.

The Wild Geese which visit the Bristol Channel district seem to keep chiefly to certain favourite haunts above the Severn Tunnel. Only three species, as a rule, are found—the Bean (which is the first to arrive), the White-fronted, and the Brent Geese. Of these, small numbers of the two former species visit the Brue and Huntspill Levels during hard winters, as well as appearing occasionally on various parts of the coast; while the Brent Goose may sometimes be seen in small parties in the Channel, but never seems to visit the inland marshes. Swans are sometimes seen off Burnham in very severe weather.

At one time the central level of Somerset and Bridgewater Bay must have been a very favourite winter resort for Wild Ducks. About a hundred years ago much of the flat inland district was uncultivated, and liable in winter to very extensive floods, which still occur, but not to the same extent as formerly. This district consisted of some thirteen square miles of marsh and reedy meadows, broken in the centre by the low line of the Polden Hills. It is now about a century since this tract was drained, and with the spread of cultivation the marsh lost much of its former attractiveness for wildfowl. Traces, however, of its former fen aspect still remain, and the ornithologist of to-day may still expect to meet with all sorts of surprises. No less than thirteen duck-decoys have existed here from time to time, and this fact bears eloquent testimony to the former abundance of wildfowl, but at the present time only one, situated on Sedgmoor, is regularly worked, and this with very moderate success. Large numbers of Duck and Teal, however, still occur, a good many of the former and a few of the latter remaining to breed; while Wigeon—once, according to Colonel Montagu, very abundant—occur in very small numbers, with a few Pintails and Shovelers. A pair or two of the last-mentioned species have been known to nest on the peat moor to the north of the Polden Hills. The mud-flats and waters of Bridgewater Bay afford by day a safe refuge for many of these various species, where a strong glass will often reveal them, apparently sleeping, but in reality always on the alert.

The most attractive bird regularly met with on the Somerset coast is the Common Sheld-Duck. Perhaps nowhere in England is it more abundant than on the shores of Bridgewater Bay. There are many localities on the coast where these birds breed, but the largest colonies are on Brean Down, among the sand-hills from Brean to Steart Point, and in the warren at Minehead. Early in the nesting season I have seen one hundred and fifty pairs together on Brean Down, and almost as many on the flats opposite Burnham. The site usually selected for the nest is a Rabbit-burrow, but I have found the eggs in crevices of the face of a cliff, beneath a thick bush, and even in a bed of nettles. In this last situation the eggs could easily be seen from above. The young are usually hatched early in July, and then the various broods seem to congregate, and one may often notice as many as forty downy ducklings on the sea following one pair of old birds. Towards the close of the breeding season and through the autumn this bird gets scarcer on the coast, and during October and November hardly one will be seen. Observers in Wales and on the south coast of England have also noticed this late autumn migration, and it has often puzzled me where the birds go to. Can it be that the birds moult at this season, and so seek a place of refuge on the open sea while incapable of sustained flight, or do they leave the country altogether in search of warmer climes? I do not think the last can be the true explanation, as the birds begin to return early in December, and during the coldest months their numbers in Bridgewater Bay are probably greater than at any other season of the year. On the last day of the year 1903 I counted five hundred in one flock on the Berrow Flats during a spell of cold weather, and smaller parties were feeding at no great distance. In Somerset the species, from its breeding habits, is always called the "Burrow Duck."

From the end of October until the middle of April the shallow bays on the Somerset coast are frequented by flocks of diving Ducks, and during very cold or stormy weather these flocks increase greatly in size. By far the greater number of these Ducks belong to one species—the Scaup Duck—called by the fishermen Diving Curre, or Black Wigeon, and all through the winter months flocks of two hundred or three hundred may be

seen in the bays around Weston-super-Mare. On the day I saw the five hundred Sheld-Ducks, mentioned above, quite seven hundred Scaup and some one hundred and fifty Wild Duck were sheltering with them from a keen wind under the lee of Brean Down. Smaller parties of Scoters, Golden-eyes, Tufted Ducks, and Pochards also occur, and mingle with the flocks of Scaups, but, as far as my experience goes, these four species are by no means common. The three "Mergansers" have from time to time put in an appearance, but must all be considered as rarities.

It has often been stated that the Rock-Dove breeds on the Somerset coast, but I feel sure that the birds noticed were either Pigeons from some farm reverting to a wild state, or that the Stock-Dove was the species seen. A few pairs of this latter bird breed on the cliffs in the west, and its numbers may be expected to increase. The Turtle-Dove and Ring-Dove are common birds in the county, the latter often breeding close to the sea where the woods extend to the coast.

Black Game are plentiful on the heather and whortleberry-clad heights in West Somerset, and I have often noticed the Red-legged Partridge on Brean Down, where a few pairs seem to breed. Quail have frequently nested near Bridgewater, and the Water-Rail, under the name of "Skitty," nests commonly on the peat-moors, where also the Spotted Crake is to be found in winter, and there is strong evidence that some remain to breed. I have never seen the Coot on the coast, but they occur on some inland waters.

As the class of birds known as "The Waders" contains the most interesting of the shore-frequenting species, a few details respecting those which may be found in Somerset may be of interest. Most of the rare species, such as the Wood-Sandpiper and the Dusky Redshank, have occurred accidentally, but it is of more general interest in a sketch of this kind to treat of those species which occur with tolerable regularity. The two commonest birds of this class, without doubt, are the Dunlin and Ringed Plover. These species consort together, and enormous flocks are sometimes seen on the mud-flats. Small parties of Dunlins which are not breeding stay on the coast throughout the summer, but they are most numerous from the middle of August, when the breeding birds begin to return, until the beginning of

May, when the majority leave for northern moorlands. There is no direct evidence that any have nested on Exmoor.

The Ringed Plover, unlike the Dunlin, remains to breed, but its numbers are decidedly augmented in autumn and winter. A good many lay their eggs on the shingle at Steart Island and Steart Point, as well as among the sand-dunes at Berrow and elsewhere along the coast. Several pairs of Oystercatchers also breed in similar haunts, and I have found as many as four nests in a morning in one favourite locality, but not all the birds of this species seen in summer are breeding, and sometimes in June as many as sixty may be seen together. In winter flocks up to two hundred in number may be seen on the Berrow Flats, a feeding ground to which they seem at all seasons to be particularly partial. Flocks of Golden and Grey Plover, sometimes large, occur in autumn, the former seeming to prefer the moors, the latter the mud-flats; some are seen also through the winter, and again in spring on their way to their breeding grounds. A few pairs of Golden Plover perhaps remain to breed on Exmoor, where I have seen small and large parties early in the Stag-hunting season. A few Lapwings lay their eggs on the shingle and among the sand-dunes, but this species always prefers the grassy water-meadows, where in autumn large flocks congregate. Turnstones are sometimes seen on the coast in summer, but their usual times of appearance are autumn and spring. One day late in April I saw a flock of quite one hundred at Steart Point in full breeding plumage.

The Woodcock breeds sparingly in some of the sheltered coverts in the west, and the Snipe breeds both on Exmoor and on the central level, where at times in the winter they are very abundant. They are often flushed from the sandhills by the coast.

The Curlew-Sandpiper and Purple Sandpiper occur sometimes in autumn, the former probably escaping notice among the flocks of Dunlins. The latter prefers a rocky shore, and is not often met with in Somerset. The Knot is an autumn visitor, arriving in September, and I am told that it sometimes visits the Burnham mud-flats in large numbers, though personally I have only seen small parties on the Somerset coast, where I think they only make a very short stay. Sanderlings arrive in small

numbers early in August, and as a rule soon pass on, though I have seen a party of forty in mid-winter. The Common Sandpiper arrives singly or in pairs on the coast about the middle of April, usually frequenting the estuaries of rivers, but they soon leave for their breeding haunts by the Exmoor streams and in Wales. They return to the coast early in August, and sometimes stay until late in October before passing south. The Green Sandpiper is sometimes seen in spring, but is chiefly a visitor in early autumn, keeping rather to the muddy creeks than to the bare flats. A few Bar-tailed Godwits come in autumn, and Redshanks haunt the muddy estuaries throughout the winter, a pair or two perhaps staying to breed.

Numbers of Curlews frequent the mud-flats throughout the year, being less numerous from early spring to late summer, when the breeding birds are away on the moors. Many pairs nest in the Exmoor country. Towards the end of April a few Whimbrel arrive on the coast, and their numbers increase in May, during which month most of the birds pass on, but a few which are not breeding stay throughout the summer, and are joined early in August by arrivals from the north. They seem to leave again for the south during September, but the autumn migration is not, according to my experience, so pronounced as that in spring. Other members of this order of birds, such as the Dotterel, Ruff, Greenshank, Stone-Curlew, Little Stint, and Black-tailed Godwit, are only seen on very rare occasions on the Somerset coast.

The Bristol Channel is not much frequented by the Tern family, but the Arctic, Common, Little, and Black Terns are occasional spring and autumn visitors, though the naturalist on the shore will not often meet with them.

Gulls are far more numerous, among which the rare Sabine's Gull has frequently been shot in September, usually in immature plumage, and other rare species are from time to time obtained. Among the species which may regularly be seen, the commonest by far is the Black-headed Gull. Young and old arrive on the coast early in July, and from that time until the middle of March they may be seen in flocks up to four hundred or more on the mud-flats, and at the mouths of rivers. They leave very early for their nesting haunts, but a few non-breeders and young linger on through the summer.

Numbers of Kittiwakes sometimes come into the bays in winter following the shoals of Sprats, but I have not found this species so numerous on the Somerset shores as the Common Gull, which appears in large flocks early in August, and is much later in starting for its breeding haunts in spring than the Black-headed Gull, not leaving until the end of April.

About twenty-five pairs of Herring and Lesser Black-backed Gulls breed together at the present time on the north face of Steep Holm, an island in the Channel included in the parish of Brean, and among them two or three pairs of Kittiwakes nest. There are no Gulls breeding on the mainland sea-cliffs of Somerset at the present day, but a colony of Herring-Gulls nest on the Lynton Foreland, only three miles beyond the western boundary of the county. The larger Gulls are not numerous at any time upon the coast, the Greater Black-backed Gull being only seen occasionally, either singly or in pairs.

Razorbills, Guillemots, and Puffins are frequently found dead on the Somerset coast after gales, but they are rarely seen alive, as they keep well out in the Channel, and sometimes visit the Sprat-nets around the Holms. The two first mentioned seem to have nested formerly on Steep Holm, and boatmen have shown me places on the island where the "Murres," as they call them, used to breed. This rock was once a great resort for seafowl, and I am told their eggs were taken to Bristol and made use of at sugar refineries. An old resident at Weston-super-Mare remembers Kittiwakes breeding there "in innumerable numbers" less than thirty years ago, but this is certainly not the case now. Perhaps the erection of the batteries on the island some thirty-six years ago, and the consequent need of resident gunners, had something to do with banishing the breeding seafowl. The *Alcidae* which now find their way up the Channel doubtless come from Lundy or the South Wales breeding stations. Divers and Grebes are rare on the Somerset coasts, probably finding the water too opaque and muddy to suit their fishing habits, and the Skuas, Shearwaters, and Petrels which are occasionally noticed may be considered as wanderers from more distant haunts, or accidental visitors blown into the Channel by adverse gales. It seems strange that the Manx Shearwater, which breeds in large numbers in the Scilly Islands, and on

Skomer, off Pembrokeshire, has only been noticed on very rare occasions off the coast of Somerset.

This paper on the birds inhabiting the seaboard of Somerset, as already stated, is not intended to deal fully with all the species found in that district, and several kinds of land-birds have been omitted. When treating, however, of the essentially shore-birds, such as Ducks, Gulls, and Waders, particular care has been taken to note their times of arrival and departure, and the length of their stay. It is not improbable that if more continued observation had been possible these dates would have required some modification. I have, however, kept careful records of the movements of birds on this coast for the last six years, and so it is to be hoped that a fair amount of accuracy has been obtained. If any reader acquainted with this district is able to throw light on some of the doubtful points mentioned in this sketch, or to add further interesting particulars, I shall be very pleased to receive communications on the subject.

## ON THE NESTING HABITS OF THE COMMON BUZZARD.

By Professor J. H. SALTER, University College, Aberystwith.

WHILE the term "common," as applied to the present species, merely serves to recall the fact of its having formerly been probably the most familiar and widely distributed of the larger birds of prey, there are certain districts where the epithet is still merited. Such are certain parts of Wales where, over a wide stretch of country, the Buzzard still exists in fair numbers, and seems likely to hold its own for many years to come. Banished to a large extent from the game-preserving districts, it finds a stronghold amongst the rocky dales which intersect the upland sheep-walks. There are many such where, except for the whistle of a chance shepherd or the barking of his dogs, the mewing of the Buzzard is the only sound which breaks the stillness. In at least one such locality, owing to protection, the "Boda" (to give the bird its common Welsh name) has decidedly increased in numbers within the past twenty years. Here the only danger which threatens it is the greed of the egg-collector, with his offer for "British-taken clutches" of a price which leads certain dealers to raid the whole district annually. In coming years it will be increasingly rare for a naturalist to have the opportunity once enjoyed by the writer of watching the Raven, Kite and Buzzard upon the wing at the same time.

The flight of the Buzzard lends to the bird a dignity scarcely borne out by its true character. We may chance, in rounding some rocky buttress, to surprise one at close quarters. As it wheels overhead we can see the yellow cere, watch every motion of its head, and even note the expression of its eye. But a few flaps carry it half-way across the valley. Then, joined meanwhile by another, it soars. The wings are thrown upward till they appear nearly vertical, and the bird mounts in a series of grand spiral curves. Now, as it turns, the sun glances upon the light

under side of its wings. Higher it goes, till lost against the blue, then coming into sight again against the white cloud-masses which herald the coming shower. The whole of this aerial evolution is directed by slight movements of the tail rather than by any appreciable motion of the wings. At other times the bird presents an entirely different outline as it crosses the valley, flying fast and low, with wings incompletely expanded, *i. e.* bent at the carpal joint. Or, partially closing its wings in this way, it will fall rapidly, almost in the style of the Raven. Occasionally the Buzzard hovers like a giant Kestrel, but the mechanism appears to be different, as there is not the tremulous movement of the wings, the downward glide and quick recovery observable in the case of the latter bird. An old shepherd, seeing a Buzzard hang in this way against the wind, remarked that it was a sign of foul weather to come, and, sure enough, a notable storm of wind and rain shortly followed.

Early in the day, the Buzzard may be seen working in a business-like way along the rocky slopes, alighting frequently, and evidently making its morning meal. In close damp weather it will remain listlessly perched for hours, but, if the evening be fine, always soars towards sunset. A bold craggy hill at the meeting-point of two valleys is a favourite rendezvous and place of call for all the large birds of the district. Here half a dozen Buzzards may be seen thus disporting themselves, as if to catch the last rays of light. The birds are late abroad, and sometimes come overhead, shadowy and Owl-like in the dusk.

The staple food of the Buzzard—at any rate, upon the sheep-walks—is probably furnished by dung-beetles of the genus *Geotrupes*. It is not averse to carrion, and joins the Raven at the feast when a sheep has perished in the March snowdrifts. One was seen carrying off with some difficulty a dead lamb of perhaps three days old; its mate flew round it excitedly. A friend of the writer's watched a Buzzard rise from the hillside above Barmouth with a snake writhing in its claws. It has been seen to catch a wounded Partridge, and is partial to Moles. It was observed that a pair of Buzzards completely cleared off the latter from the fields below the rock which they had selected as a nesting-site. The nature of the food supplied to the young birds will be referred to later.

As early as the middle of March the Buzzard selects a nesting-site, or more usually begins to repair one of its nests of a previous year. Thus, on March 17th, Mr. Grubb tells me that in a bright interval between snow-showers he watched a Buzzard carrying a large stick to its nest, though the frost had been so sharp the previous night that the little river was frozen half-way across. In addition to its favourite and most usual site, each old pair has at least one alternative nest. They will often repair both, even so far as to put in lining, finally deserting the two in favour of a fresh choice. Snow in early April sometimes hinders building operations, and comparison of a number of dates shows that egg-laying does not ordinarily begin till the third week of that month ; eggs may be found by April 18th, but seldom earlier. By May 15th, if all goes well, the nest contains newly-hatched young, and just a month later these are ready to leave the nest. Some birds are evidently later in breeding than others, but fresh eggs found towards the close of May evidently represent a second attempt, due to the first eggs having been taken.

Evidence favours the view that the Buzzard is not naturally a rock-breeder. It does not select the bare precipitous cliff which often furnishes the Raven with a nesting-site. The sides of the narrow dale are marked by broken outcrops of the grey Silurian rock, over which the sheep everywhere make their way amongst the bilberry and heather to reach the scanty grass upon the ledges. Ivy mantles a part of the rock-face ; birch, rowan, and holly find roothold in the crevices. There is seldom a sheer fall of more than twenty feet. Upon one of the ledges, behind and supported by a small tree which springs from the rock, is the big pile of sticks which serves the Buzzard as a nest. Nine out of ten such nesting-sites can be reached without a rope with perfect ease. I have seen the nest upon steep screes supported by a shrub of birch with scarcely anything of a fall below it, and Mr. Grubb writes of a similar nest upon a bare scree far from any rock, resting upon a tiny hawthorn-bush. A nest tenanted by Buzzards one season is sometimes found to be occupied the next year by a pair of Ravens. If both are absent, Kestrels probably take possession. Mr. Grubb found a Kestrel thus sitting upon two Buzzards' eggs and three of her own. In one

instance Raven, Buzzard, and Kestrel successively occupied the same nest the same spring, but in each instance the eggs were taken. In nesting the Raven is said to prefer a western aspect, while the Buzzard avoids the west, disliking exposure to wet winds ; but the Raven chooses a deep niche, well overhung, and thus obtains shelter.

Even where there is an unlimited choice of nesting-sites upon wooded rocks, a tree is sometimes selected. Oak is the natural growth of these valleys, though little is left except in isolated spots, chiefly in rocky and inaccessible gulleys. When an oak is chosen it is noticeable that the Buzzard selects a side branch, while the Kite prefers the main fork from which the larger branches diverge. A first year's nest is small and compact, often founded upon the substructure of an old Crow's or Magpie's. In several cases the Buzzard has taken to nests built and formerly occupied by the Kite. One such was for a single season in possession of Ravens ; the Kites are gone, and the Buzzards are now in undisputed possession of the huge structure. I once found a presumably young and inexperienced pair building a nest of easiest access in a small sycamore close to a ruined sheep-fold. Nearer to the low country where the valleys alter in character and become less rocky, the Buzzard becomes ordinarily a tree-builder. Where larch-plantations prevail, as upon the Cardiganshire side of the mountains, that tree is often selected, sometimes a Scotch fir, or occasionally a spruce. The trees are not of tall growth, and the nest is commonly not more than 25 to 30 ft. from the ground.

For nest-building purposes, the Buzzard selects sticks of smaller diameter than those which are chosen by the Raven. Built up by annual additions, the pile often becomes three feet across, and of nearly the same height. But sometimes, when placed upon a ledge, the nest is little more than a hollow formed by flattening down the heather and bilberry. Mr. Grubb mentions a nest of this description as consisting of not more than half a dozen sticks, so that the one young bird rested upon the bare ground. In another instance the whole ledge, nearly a yard wide, was a nest-platform, littered with bits of stick, sedge, and dry grass, while in the middle, in just the slightest grass-lined hollow, lay the two eggs. The lining ordinarily consists of finer

twigs, upon which are placed dead leaves, tufts of *Luzula sylvatica*, or of the small *Scirpus* torn up by the roots, or dry stalks and fronds of the brake-fern. A well-known characteristic of the Buzzard is its habit of decking the nest with fresh-pulled leafy twigs, often of the birch or rowan. These are renewed from time to time as the young grow. A nest examined last April was most artistically finished with a lining of fresh green sprays of leafing larch, sprigs of Scotch fir, ivy-leaves, and pieces of bracken frond.

The Buzzard is never seen to such advantage as when disturbed by our intrusion in the neighbourhood of its nest. Its flight then becomes more active and graceful, its whole bearing more animated. Probably the male bird is first seen soaring above the rocks, wheeling round with angry gestures and indignant mewing cry. Suddenly he swoops and skims at full speed past the crag where the nest is situated. Leaving her eggs, the hen bird joins him, and as we climb both circle overhead, mewing piercingly and persistently. There are well-recorded instances where something very nearly resembling an attack has been made, but nothing of the kind has ever occurred within the writer's personal experience. Sometimes in the case of a pair one may note a considerable difference in plumage, one having the whole of the breast dark, while the other is largely ash-coloured.

If incubating, the hen bird sits close, and leaves her eggs with reluctance. A friend writes of his first Buzzard's nest: "It was not till I got to the top of the cliff and saw her sitting on her eggs within twenty yards of me that she deigned to fly off." Mr. Grubb knew of a nest situated close to the top of a small cliff. He says: "Approaching from behind, I looked over the edge, and found the old bird within about two feet of my face. She was evidently a little uneasy, and was standing up in the nest, peering over the edge. When she caught sight of me there was a fine commotion!"

When the Raven and Buzzard are nesting in close proximity they appear to spend half their time in harmless skirmishing. The cock Raven makes angry sallies to drive off the Buzzards whenever they approach his domain. The Buzzard, rising lightly, swerves to avoid the downward rush of his sable foe.

Kestrels, Jackdaws, and Carrion-Crows join in the tournament, and some graceful aerial tactics may be witnessed.

The eggs laid by the Welsh Buzzards are said to be large as compared with specimens from the Continent. Three is the most frequent number, but clutches of two are extremely common : and I have known a bird, which from its light bleached appearance was probably very old, to lay one egg only for several years in succession. Clutches of four occur, but are most exceptional. The eggs as a rule are not well marked. Where three in number, one will probably be blotched and clouded with red, one slightly marked, the third almost colourless, but quite commonly all three are of the last-named type. In one case, however, all three eggs were exceptionally well marked. It is usually said that it is impossible to distinguish eggs of the Common Buzzard from those of the Kite. The few Welsh Kites' eggs which I have had the opportunity of examining differed from Buzzards' eggs in being somewhat larger, very slightly pointed at one end, and of a more bluish-white ground colour.

The young Buzzards are covered with straight greyish down, whiter on the front of the neck and breast. The eyes are black, the cere is yellow, and the rest of the beak black. They have a feeble piping note, which may be heard before the young bird is freed from the shell. Incubation appears to commence as soon as the first egg is laid. The young are consequently hatched at intervals of one or perhaps two days. The nestling which is first hatched is naturally the strongest, and the result is frequently a family tragedy. It appears to be quite the usual thing for the first-born to kill one if not both of his younger brothers. I first became aware of this habit ten years ago while examining a brood of three young Buzzards. One of them, fierce as an eaglet, struck at my finger, and at a Shrew which I held to him, then caught one of his fellow-nestlings by the nape of the neck, and pecked and worried him with all his might. Again, referring to two newly-hatched young, I have a note : "The stronger one bullied the other one unmercifully, and was evidently in process of doing it to death." Mr. Grubb writes of a nest which "had three young when I first saw it, but one was rapidly bullying the others to death. A week later this one—the biggest of the three—had finished his brothers, and grown proportionately." As

confirming this curious feature of the Buzzard's domestic economy, a good observer remarked to me that, while three eggs are frequently laid, the bird never brings off three young. This appears to be the case in the hills, but in the lower and more fertile valleys, where food is abundant, I have known several instances in which three young were reared.

A flat rock in the neighbourhood of the nest is selected as a dining-table, and is usually strewn with feathers, castings, and perhaps the remains of a small lamb. The young call vociferously for food long after they have left the nest. The old birds bring Mice and Field-Voles, young Rabbits, and an occasional Leveret; also Moles, and such few birds as they can catch. The ardent bird protectionists who assert that the Buzzard never takes young game-birds have probably never had a hungry brood under observation. When beating over the moor a Grouse cheeper is sometimes caught up, and in the lower woodland districts a young Pheasant is now and again surprised in the neighbourhood of the coops. But in the wilder hill-districts the Buzzard must be looked upon as being absolutely harmless, since Grouse are rare upon the sheep-walks, and Pheasants non-existent. More good would probably be done by trying to induce landowners and game-preservers to share the view that the presence of this fine bird lends an element of interest and beauty to the wild scenes which it frequents, than by making in its favour random statements which any gamekeeper who knows the habits of the Buzzard when it has young to provide for will at once dispute.

ROUGH NOTES ON DERBYSHIRE ORNITHOLOGY,  
1902-1903.

BY THE REV. FRANCIS C. R. JOURDAIN, M.A., M.B.O.U.

1902.

THESE notes are continued from 'The Zoologist,' 1902, p. 459.

Mr. W. H. Walton informed me that he saw a male Merlin, recently killed, exposed on a keeper's gallows at Howden on June 21st, which looks as if these birds had again attempted to breed on the moors. A pair of Nightingales also bred this spring near Ockbrook (W. H. Walton).

A white Rook was haunting the Egginton district, and many attempts had already been made on Oct. 6th to shoot the unfortunate bird, which was still able to rise from the ground in spite of a broken leg (G. Pullen). A Badger was picked up on the Great Northern line near Egginton, which had been killed by a passing train, and others were seen near the Fox-covert (*id.*). While looking at a young Pheasant in my garden on Nov. 6th, I was astonished to see a second bird take wing from one of the chimneys where it was perched, followed by a third from the lawn ! This is the only time I have ever seen a Pheasant perch on a building. During the floods in the Dove Valley at the end of November many Dippers were to be seen flying high in the direction of the tributary streams. These winter floods always seem to drive the Dippers from the river, although at other times they are strictly sedentary.

1903.

*January 17th.*—Flocks of Siskins feeding on the alders at Calwich. On the 26th A. S. Hutchinson received a fine Brent, a solitary bird which had been driven inland by the storms of mid-January. It was shot on the river near Rocester, and is the only definite occurrence of this species in the county for seventeen years past. A male Ruff was sent in for preservation from the

sewage-farm on Feb. 3rd, where two or three others were seen with it; and Hutchinson informed me that there were three birds when he shot the male, now in the Rolleston Hall collection, on the same ground on March 1st, 1897. It is difficult to believe that these birds, if unmolested, would not breed in the neighbourhood.

*March 18th.*—The first Wild Duck's egg reported to-day from Repton, while the Chiffchaff arrived on the 22nd, and was singing briskly at 8 a.m. next morning. The smart shock of earthquake felt here on the 24th did not appear to produce any alarm among the birds which were singing at the time. On the 29th an Egyptian Goose was seen on Yeldersley Pond, and remained there for some time. On April 2nd, after some search, I found a pair of Herons breeding in a big Scotch fir standing in a small plantation near Longford. The remains of an old nest were visible in the same tree. About this time some men who were building a cart-shed at Osmaston found a Badger inside it when they arrived at their work in the morning, and managed to secure it. It was carefully locked up in an outhouse, and its capture duly recorded in the local paper, but next morning the Badger had disappeared, having effected its escape in the night!

While returning to Clifton with some friends on the evening of April 10th, we noticed a Lapwing get up from a field ahead of us, but another Lapwing which was flying about immediately stooped at it, and drove it to the ground. A second attempt to rise was defeated in the same way. As we got nearer the aggressor flew away, and presently we saw the crouching bird get up, but it had barely travelled thirty yards before a Sparrow-Hawk dropped on to it like a flash from an ash-tree (where it must have been all the time), and seized the Lapwing by the head. For several seconds a violent struggle in the air ensued, during which time the Lapwing continued to scream loudly, but at last the Hawk failed to make good its hold, and the Lapwing broke away and flew off heavily. I have frequently picked up the remains of dead Lapwings on their breeding grounds, which were in all probability killed by Sparrow-Hawks, and I have seen the sternum on an old nest used as a "dining-table," but never actually saw one struck by a Sparrow-Hawk till to-day.

Early in May one of the keepers at Farley, Staffordshire,

came across a Woodcock's nest with three recently hatched young. Three nests of the Grasshopper-Warbler were found this year at Repton—the first, with five eggs, on May 22nd ; the second, with six eggs, among coarse vegetation on low ground on June 2nd ; and the third, which only contained three eggs, on June 10th. There seems to be much variety in the nesting-sites used by Sandpipers in this district. I have already mentioned (Zool. 1900, p. 431) a nest among grass by the side of the North Staffordshire Railway, only eight feet from the metals. This year a nest was found at Osmaston, right in the middle of a wheat-field, some forty yards from the hedge, and nearly a quarter of a mile away from water. A third, photographed by Mr. R. B. Lodge in 'Pictures of Bird Life,' p. 363, was well sheltered by tall burdocks close to the edge of the River Dove, while a fourth was a hollow on the side of a steep little bank, and was approached by a long run.

On May 27th a pair of Great Spotted Woodpeckers had just finished cutting out an entirely new nesting-hole in a dead stump standing in the Ramsor Woods, but they were promptly dispossessed by a pair of Starlings, apparently the same birds which had already reared one brood from an old Woodpeckers' hole not far away. Although I removed the Starling's nest, the Woodpeckers would not return to their hole, but took possession of an old boring in another dead tree quite forty feet from the ground, and succeeded in bringing off their brood without further molestation. Not far from these woods Mr. Lodge and I came across a fine Grass-Snake, only an inch short of three feet long, on June 2nd. These reptiles are by no means common in the Dove Valley.

On June 8th I visited the Swift colony at Ashburne, and at once saw that something was wrong. There were hardly any birds about, and on examination I found that there were dead Swifts in nearly every nest-hole. Altogether from seven nests I took out eleven dead Swifts, which had evidently been there for some time, as they were much eaten by maggots. Two of the nesting-holes appeared to be still occupied, but there were no eggs, and only four birds were to be seen in the vicinity. Presumably the very cold and inclement weather of May and the consequent dearth of insect-life had caused this wholesale

destruction, and possibly there may be some connection between it and the late stay of the Swifts reported from many parts of England. I had no opportunity of examining the nests again later in the year, but was told that this breeding-place was afterwards entirely deserted by the Swifts, although for more than thirty years past every available hole had always been occupied. On the evening of the same day I found a Moorhen's nest in a quickset hedge, about 3 ft. 6 in. from the ground, which contained a single young bird in a moribund state, apparently deserted by its parents. The fields in the neighbourhood are subject to floods, and I have frequently flushed Moorhens from the tops of a number of spruce-firs thirty or forty feet high in an adjacent plantation, and am inclined to believe that an empty nest which I once found in one of these firs belonged to this species. Another bird which I have never before found nesting in a hedge is the Pied Wagtail; yet on June 14th I found a large, substantial nest of this bird in a rather slight bit of hedge close to the roadside. The hen was sitting on the nest, which contained five slightly incubated eggs. One of the keepers at Osmaston showed me a Blackbird's nest in mowing-grass at some considerable distance from any hedgerow or bush. It contained young birds on June 23rd, and my informant assured me that he had noticed two or three nests this year in similar places.

There were probably about seven couple of Tufted Ducks breeding on the ponds at Osmaston this year, and perhaps three more at Yeldersley. Mr. W. Boulsover tells me that this year they bred at a pond in Hassop Park, and most likely at Ashford Lake as well, as five or six birds were seen there throughout the summer.

Under date of July 15th, Mr. H. G. Tomlinson writes that "the young are just hatching in a Willow-Wren's nest in a holly-bush five feet from the ground" at Burton. Curiously enough, the Wild Duck furnishes the last as well as the first item in my egg-journal for 1903, for on Oct. 2nd Mr. W. H. Walton found one sitting on thirteen eggs near Monk's Pool, Breadsall.

Mr. A. S. Hutchinson informs me that among the birds which passed through his hands were a "lemon-coloured Chiffchaff and a white Willow-Wren."

The persistently dull and wet weather which was characteristic

of the summer and autumn of 1903 seemed to have the effect of putting a stop to the usual outburst of autumn song on the part of the Chiffchaff, and I have only notes of having heard it between Sept. 20th and 25th.

Mr. G. Pullen kindly drew my attention to a hitherto unrecorded specimen of Sabine's Gull (*Xema sabini*), which has been in the museum at Derby since 1894, in which year it was shot at Chaddesden about Aug. 26th. It is a young bird with the black-bordered tail of immaturity. This is the first instance of the occurrence of this bird in Derbyshire.

F. B. Whitlock, in 1893, estimated the total number of species which have occurred in the county at 241, but in this number he included five species which have never been allowed a place on the British list, *viz.* the Red-eyed Flycatcher (*Vireo olivaceus*), the White-bellied Swallow (*Tachycineta bicolor*), the Canada Goose (*Bernicla canadensis*), the Egyptian Goose (*Chenalopex aegyptiaca*), and the Summer Duck (*Aix sponsa*). Seven other species were included on insufficient and in some cases quite erroneous evidence, thus reducing the number of definitely recorded species to 229; but more recent evidence enables us to restore one of them—the Blue-headed Wagtail (*Motacilla flava*)—to the list, while four new ones have been added, *viz.* Montagu's Harrier (*Circus cineraceus*), the Night Heron (*Nycticorax griseus*), Sabine's Gull (*Xema sabini*), and the Black-throated Diver (*Colymbus arcticus*); so that we have now reasonable proof of the occurrence of 234 species within our limits.

## THE GESTATION OF THE BADGER.

BY ALFRED HENEAGE COCKS, M.A.

MR. JAMES PATERSON's experience, as related by Mr. C. Cook (*ante*, p. 30), forms a new link in the curiously twisted chain of evidence on this puzzling question. I therefore wrote to Mr. Paterson, requesting further particulars, and he has very kindly sent me the following full and interesting account of his experiences (here very slightly abridged in a few places from the original).

I have also hunted up every scrap of information my own small library furnished relative to the breeding of this species, with the result that I have been led to what is certainly a surprising conclusion as to the gestation ; and, as it is an entirely new one to me, it assuredly is not the product of any theory unconsciously held. Whether it will meet with general acceptance remains to be seen.

Mr. Paterson writes :—“ My first Badger to be kept in confinement was a female, caught by my son on Jan. 15th, 1897. Noticing a newly-wrought earth on a lone hillside, where bundles of rough bracken and fern were so arranged about the entrance as almost to conceal it, his curiosity was aroused ; so, digging the place, he secured its solitary occupant, and brought her home. On Feb. 27th following she gave birth to three cubs, of which one (a female) was successfully reared. On Nov. 25th I secured a male. The following spring and summer, *i. e.* 1898, were times of diligent watchfulness after sundown, for it would appear that no amount of captivity will change a Badger from its nocturnal ways. At last I had my reward, as on July 10th an attempt to mate with the old female was noted ; and this was followed two nights later by an undoubted pairing. My vigilance after this somewhat relaxed, and nothing further of importance was seen.

“ On Feb. 13th, 1899, going into the kennel, I saw something was wrong by the way the old female sprung out of a corner, and found a young one there, dead. Judging from its appearance in comparison to the young of the previous year, I concluded that another three weeks or perhaps a month would have been required to have brought it to maturity.

"From this, partially corroborated by subsequent events, do I ground my belief in the eight months' gestation.

"A few days before this occurred I had been making some interior alterations, so as to separate the male from the females, and the unusual disturbance probably caused the mishap.

"The spring and summer were again times of special care, particularly July; no successful pairing, but only attempts were this time noted, and these were in the month mentioned. However, on Feb. 27th, 1900, the young female gave birth to a pair, she being on that day three years old. On March 8th the old female also gave birth to a pair, but one of these was dead. I may here say my old female became paralysed shortly after this, losing all power in back and hind-quarters; but otherwise she appeared healthy enough, and nursed her young, or, more properly speaking, 'conjointly' nursed *the* young. During the summer months first one dam and then the other might be seen nursing all three cubs together, and no quarrel occurring. This was an interesting period, and the docility displayed by the old male towards the teasing youngsters was both amusing and surprising.

"The state of the old female precluded all hope of further breeding from her, and my ensuing summer's observations were but a repetition of the previous July, but in regard to the young female only.

"Feb. 21st, 1901, saw another pair of cubs bred from the latter, and this is the last litter from which I have reared young.

"Brought up in a district where Badgers are pretty numerous, I had, before keeping specimens in captivity, questioned myself how it could be possible that the young should so regularly appear every May or June, if the gestation period exceeded twelve months.

"Any person first seeing a Badger at birth would naturally conclude that it was born much before time. All mine were completely nude, and for six weeks blind. I also hold to the idea that for some time after birth the whole support they get, or seek to receive, lies in the warmth only of the dam.

"Your idea as to the probable age of the cubs whose measurements you give in 'The Zoologist,' corresponds with my own. Mine were all remarkably slow of growth the first two months, but amazingly fast the following three.

"Your experience of April 27th, when your keeper reported something wrong, was also mine on two occasions with my first lot, though not quite so fatal. We all know how easily a Fox is made to remove her young to other quarters when disturbed. A kindred feeling, I believe, pervades the Badger, and, finding this impossible when in confinement, gives rise to the excitement which only those who have kept them can understand; hence the disaster.

"My kennel at present consists of four—one male and three females—the surviving produce of the last three litters. They are now kept more as pets than for purposes of observation."

Mr. Paterson's suggested reason for the fatality to my cubs (as mentioned, Zool. 1903, p. 443) is a very likely one, though I am still inclined to think my own explanation the right one. In breeding other wild animals (Wild Cats, Martens, Otters, Pole-cats, &c.), I have always been careful to provide an alternative bed-box, of which I know well the necessity, and it was certainly a careless omission not to have done so in this instance. I cannot, however, agree with Mr. Paterson in his belief that young Badgers do not suckle for some time after birth, though the result, it must be remembered, of considerable experience.\*

An analysis of Mr. Paterson's experiences (calling his original female No. 1, and the young female born from No. 1 in 1898, No. 2) shows:—

1897.—Jan. 15th, No. 1 caught; Feb. 27th, she produced three cubs (only one, the female No. 2, reared). Nov. 25th, male caught.

1898.—Pairing observed July 10th, and especially "two nights later" = ? July 12th.

1899.—Feb. 13th, No. 1 had one cub, dead, and supposed to be premature by three weeks or a month; or conjectured natural date for birth between about March 5th and 12th. Attempts at pairing observed in July.

1900.—Feb. 27th, No. 2 had two cubs; March 8th, No. 1 had two cubs. Attempts at pairing with No. 2 seen in July.

1901.—Feb. 21st, No. 2 had two cubs.

\* Gallinaceous birds, or some species of them, eat nothing for four-and-twenty hours after leaving the egg, but with young mammals, on the contrary, their very first action—I should have said invariably—is to find out how to obtain a meal. Whether, however, the non-requirement of nourishment be real or only apparent, the note tends to show the somewhat embryonic condition of the cubs.

The following synopsis shows all the scraps of evidence I know of bearing on the gestation of the Badger; most of the instances are to be found in the pages of 'The Zoologist.' Some of them were originally published in the 'Field,' next quoted in 'The Zoologist,' 1864, p. 9219, *et seq.*;\* and again quoted in 'The Zoologist,' 1888, p. 12, &c., by Mr. Harting, in quite the best account ever published of this species. Mr. G. W. Duff Assheton Smith has sent me word of another case which occurred in his collection, in which a female Badger purchased in Spain in 1891, and brought home on his yacht, "had young after being in a cage by herself for fifteen months from the time she was captured."

Reference.	Date of Pairing or Commencement of Solitary Captivity.	Young Born.	Gestation, or Minimum Period.
1. Meade-Waldo, Zool. 1894, 221	Pair born (about Feb.) 1880, and paired in Oct.?	Middle of March, 1881	Gestation ? circa 5 months
2. J. Paterson, <i>supra</i>	Paired (10 &) 12 July, 1898	Feb. 13, 1899	Gestation 7 months, supposed premature, and should have been circa 8 months
3. J. Paterson. <i>supra</i>	Paired? July, 1899	Feb. 27, 1900	{ Gestation apparently from
4. Do.	Do. ? do. do.	March 8, 1900	7½ to nearly 8 months
5. Do.	Do. ? do. 1900	Feb. 21, 1901	Gestation apparently between 7 and 7½ months
6. 'Field,' July 9, 1864; Zool. 1888, 12	Dug out in April, contained	died in June, and fœtuses	At least 9 months
7. Bell Hotel, Worcester; Zool. 1888, 12	—	—	At least full 10 months
8. 'Field,' Dec. 20, 1856; Zool. 1888, 12	—	—	Shut up 46 weeks 5 days =at least over 10½ months
9. 'Land and Water,' Dec. 12, 1868	—	—	At least 11 months
10. Haughton Hall, Salop, Zool. 1888, 12	Obtained before April 3, 1860	March 12, 1861	At least 11 months 9 days
11. Salvin, Zool. 1877, 251	[Apparently paired March 5, 1876]	Feb. 16, 1877	Gestation, a year all but about 17 days
12. Zoological Gardens, presented by J. E. Liardet	Received March 20, 1876	March 14, 1877	At least a year all but 6 days
13. Assheton Smith, Zool. 1903, 442	—	Early in March, 1903	At least about 12 months
14. Corbin, Zool. 1877, 251	—	—	At least a year or more
15. F. Allies, Worcester, Zool. 1888, 12	—	—	At least more than 12 months
16. F. Heycock, Bedford, Zool. 1888, 12	—	—	At least 13 months
17. Hull Zoological Garden, Zool. 1888, 13	—	—	At least 15 months
18. Assheton Smith, <i>supra</i>	—	—	At least 15 months
19. Butler, Oxford, Zool. 1888, 13	Obtained November, 1866	March 1, 1868	At least over 15 months

\* The birth of one litter is there stated to have taken place in April, which is a misprint for March, as shown by 'The Zoologist,' 1888. (I have not been able to refer to the 'Field' of 1861.)

Mr. Meade-Waldo's case, though the gestation is only a matter of great probability, at least proves unquestionably that Badgers (of both sexes) may become parents by the time they are about thirteen months old; and therefore that in such cases the gestation must be considerably less than twelve months.

Mr. Paterson saw an undoubted pairing on July 12th, 1898, followed by a birth on the following 13th February. The solitary cub was apparently premature, but at any rate the gestation seems proved in this case to have been in fact seven, and, as if it ought to have been, eight months; and the subsequent cases in Mr. Paterson's collection were probably also between seven and eight months.

We are justified, I think, in inferring that the young in case No. 6 would have been born the following season, and therefore the gestation would have been at least nine months.

The veteran field-naturalist, Capt. Salvin, wrote in 'The Zoologist,' 1877, p. 251, as an undoubted fact: "I can now settle that vexed question—the gestation of these curious animals—for this Badger has gone with young a year all but about seventeen days." He mentions that the same Badger had bred the previous season on Feb. 27th, and, as the second litter was born on Feb. 16th, the parents must have paired six days after the birth of the former litter.

The cases numbered 7, 8, 9, 10 may fall in very well with this period, while in No. 12 it is reasonable to suppose that the Badger had been captured at least one day before it was received at Regent's Park, and so must have been with young at least twelve days longer than Capt. Salvin's example.

No. 13 seems to agree with 12, and then the interval—though in each case there is a lack of precise dates, and therefore there is a possibility of (unintentional) inaccuracy—grows over the twelvemonth; and the last three instances extend to fifteen months, and even over, and as the last case has dates, it carries some weight. I remember the man when I was at Oxford, and purchased my first pair of Badgers from him in June, 1871. I recollect hearing of the case both from him and another man, but that of course does not prevent the possibility of error as to the date when he had acquired the female Badger.

Whatever Badgers may be as to gestation, the available

evidence shows that they are of all animals the most regular in their season for parturition. Out of twenty instances of Badgers breeding, in which either the exact date or the approximate date to within a very few days is recorded, all are between Feb. 10th and March 21st; twelve (or thirteen) in the latter month, eight (or seven)\* in February.

No doubt a larger series of cases would somewhat extend these limits, but their number seems sufficient to show that any birth outside the two months of February and March may be considered as exceptional.

Unfortunately in most cases where a remarkably long gestation has been recorded, no mention is made of the date when the young were born (or when the female was obtained), but as in every case where the date of birth is given it is perfectly normal, it is evident that there is not the slightest evidence to support the common assertion that the female Badger has the power of suspending parturition (at least not in the way imagined). But, on the other hand, I see no escape from the very curious conclusion, that the pairing may take place at any time during a range of some ten months, and yet that the young are always born within a season limited to about six weeks. In other words, it appears that the gestation may amount to anything between under five and over fifteen months, and yet that the young are all born within some six weeks of each other; and, moreover, that the females which paired earliest by no means necessarily whelp earlier during the six weeks' season than others which paired several months after them!

It seems probable, however, so far as our very slight information goes, that the length of gestation is correlated with a varying degree of maturity in the young when born.

A sentence of Mr. Paterson's bearing on this point must be here repeated. He writes:—"Any person first seeing a Badger at birth would naturally conclude that it was born much before time. All mine were completely nude, and for six weeks blind."

In the case quoted (above) from 'Land and Water,' the two young (both of which were females) were blind for twenty-nine days. In the litter bred in my collection in 1903 I could not be

\* This allows for Mr. Paterson's case, which was supposed to be premature.

certain on this point owing to the interior of the bed-box being very dark, but believe their eyes opened about the thirtieth day.\* Mr. E. W. Holdsworth (quoted by Mr. Harting, Zool. 1888, p. 11), describing cubs born in the Zoological Gardens on March 12th, 1862, which all died in the course of forty-eight hours, says :—“ They were well covered with short greyish-white hair, and had the two dark facial stripes faintly marked.” The largest of the four cubs weighed a little more than 3 oz., and measured in extreme length 7 in. “ The young did not resemble those of the *Ursidae* in being abnormally small.”

Judging the young born in my collection only by imperfect glimpses in a dark box, I cannot speak with certainty, but do not think they were so big at two days old ; at any rate, at their deaths, aged thirty-eight and thirty-nine days, they only measured about  $11\frac{3}{8}$  in. each in total length.

In this connection may be noted Mr. Paterson’s observation that the cub born after seven months’ gestation was obviously more immature than others born after a gestation lasting a few weeks longer.

Different writers give different estimates of the ordinary number of young in a Badger’s litter. In twenty-five cases the number has varied from one to four ; two is the commonest number ; while the *average* comes out at about  $2\frac{1}{4}$ .

As it is only by the accumulation of facts that the above conclusion—which I confess is a decidedly startling one—can be confirmed or refuted, I would venture to beg that all who can contribute any single scrap of evidence will be good enough to send it either to ‘The Zoologist’ direct or to me.

\* I have never seen the fact noticed, that the right eye of young mammals opens before the left. I do not remember an exception among wild animals, nor even among domestic animals, though it is very likely some occur in the latter class. From the time the lids of the right eye begin to part to the time the left eye is fully opened takes generally from thirty-six to sixty hours.

## NOTES AND QUERIES.

—  
AVES.

**Richard's Pipit** (*Anthus richardi*) in Cornwall.—On Dec. 22nd I watched for fully an hour a Richard's Pipit on the sandhills near Hayle. The bird was hawking for insects, and allowed me to crawl through the bent to within a few yards; I was thus, with the help of glasses, enabled to see the details of the plumage very minutely. The size and length of limb and tail were very striking. The whole appearance of the bird resembled a Wagtail more than a Pipit.—H. ELIOT HOWARD (Clareland, Stourport, Worcestershire).

**Great Grey Shrike** (*Lanius excubitor*) in Lancashire.—I had an opportunity a few days ago of examining a fine specimen of this bird, which had been shot near the River Mersey, at Urmston, on Jan. 23rd last, by Mr. S. Tate, of Stretford, who has had it preserved. Judging by the faint grey edges of the breast-feathers, it is an adult female. The double white wing-bar was well defined.—FRANK S. GRAVES (Balla-moor, Alderley Edge).

**Waxwings in East Anglia.**—The visitation of *Ampelis garrulus* to East Anglia during the past winter has perhaps been the largest since 1866-7, when upwards of one hundred and fifty were obtained in Norfolk alone. Mr. Lowne, of Yarmouth, and Mr. Clarke, of Snettisham, have kindly told me that they have had about thirty and fifteen respectively; and Mr. Bunn, of Lowestoft, has had several, one of which (a male in good plumage) he sent to me in the flesh about the middle of December. Others have been recorded in the local press, so the total number obtained must have amounted to about sixty.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

**Greenland Falcon** (*Falco candicans*) in Co. Donegal.—During the last week of December an immature Greenland Falcon was trapped by one of the tenants on Horn Head.—H. ELIOT HOWARD (Clareland, Stourport, Worcestershire).

**Migration in 1903.**—I would like to ask the question, in order to set others—as well as myself—a-thinking: How (why) has it happened

that, in 1903, we had such an abnormal immigration of Rough-legged Buzzards, Great Grey Shrikes, Waxwings, and other rarities, with the meteorological phenomena of *mild wet* weather and strong prevalence of westerly winds? In *severe* winters we are not astonished to meet with rare continental visitants, and usually mild wet autumns and winters in the British Isles are not accompanied by abnormal flights of continental rarities. Why have we such an exception as in 1903? Are the European centres becoming in any way congested and over-filled? Is it a natural pressure there, independent of climatal conditions? We had a record season in Woodcocks in 1903 for the midland counties of Scotland, but merely *driblets* of these birds in Shetland, as compared with 1902, which was their record year! On the other hand, *Snipe* have been scarcer than normal, *in 1903*. In May, 1902, scores (hundreds more likely) of Snipes perished, due to frost (17° on 3rd May). But Woodcocks bred *freely*, and reared their young about the same time in *better* sheltered localities—*here*, and in the central counties of Scotland. Here Woodcocks had *second layings*, and hatched these out quite a fortnight later than normal. I had twelve nests (at least) on an acreage of coppice of some twenty-two acres in 1902, but in 1903 just the usual number of some three to four nests (*i. e.* of Woodcock). Scores of dead young Snipe were found at same time on exposed ground, lying within five to fifteen feet of the newly-hatched shells of the eggs. This was upon the 4th May (17° of frost the night—or two nights—before!). Both Snipes' and Woodcocks' were probably second layings. The questions I have asked, *I think*, are worthy of some thought.—J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire, N.B.).

**Birds of Oxon or Bucks.**—I am obliged to Mr. Aplin for pointing out the confusion near the top of p. 35. The first sentence, "Turville Park" to "county," refers to the Ring-Ouzel; from "Reported" to end of the paragraph, to the Golden Oriole. I question whether the Ring-Ouzel is still to be "seen every season about the borders of Turville Park," though it *may* possibly be only for want of being looked for. On p. 36, line 3, "the river off" is of course a *lapsus* for "the river at."—A. H. Cocks (Poynetts, Skirmett, near Henley-on-Thames).

**Rare Birds in Berkshire.**—I am indebted to Mr. G. A. Topp, taxidermist, of Reading, for the following notes:—Merlin (*Falco asalon*). Female shot at or near Twyford, Jan. 20th, 1904. Common Guillemot (*Uria troile*). Picked up dead near Newbury, Feb. 18th. Previously seen alive by Mr. Shooter. This is the only record of a Guillemot

for Berks. Sheld-Duck (*Tadorna cornuta*). Fine female picked up exhausted at Shinfield. The only other records I have are one shot at Newbury, 1806 (Dr. Lamb), and another seen during the winter of 1867-8 near Cookham ('Birds of Berks and Bucks,' p. 205). Mr. T. Dewe kindly informs me a Shoveler (*Spatula clypeata*) was shot at Manor Farm, Longworth, Feb. 18th. I have two previous records of this bird in Berks.—HEATLEY NOBLE (Temple Combe, Henley-on-Thames).

**Old or Local Name.**—What is the bird called by Drayton the *Tydie*? (*vide* "Poly-olbion," The Thirteenth Song). Describing the birds of the Forest of Arden, he writes:—

"And of these chanting fowls, the *Goldfinch* not behind,  
That hath so many sorts descending from her kind.  
The *Tydie* for his notes as delicate as they,  
The laughing *Hecco*, then the counterfeiting *Jay*."

The *Hecco* is, of course, the Green Woodpecker (Hickle or Eacle). Drayton mentions also the *Throstle*; the *Woosell* ("that hath a golden bill"), also alluded to as the *Merle*, playing upon his "dulcet pipe"; the Nightingale; *Linnet*, *Wood-Lark*; *Reed Sparrow*; *Nope*; *Red-breast*; *Wren*; and the *Yellow-pate* (perhaps the Yellow Bunting). Drayton's knowledge of birds was rather hazy, for it is of this last that he sings—

"Which though she hurt the blooming tree,  
Yet scarce hath any bird a finer pipe than she."

A remark which should apply to his *Nope* (Bullfinch). A fine description of hunting the Stag is to be found in this song. Perhaps some Warwickshire reader can tell me what the *Tydie* is.—O. V. APLIN (Bloxham).

#### A R A C H N I D A.

How many Ovum-cocoons has a Spider after being once impregnated?—In 1901 I had under close observation a female Spider (*Tegenaria atrica*), which I placed in a large glass jar, the top being covered with a piece of gauze, kept in place by a slip-knot, and this was only loosened at feeding-time to allow a corner being lifted. During its captivity, which lasted some eighty days, when abiosis supervened, this Spider made in succession nine ovum-cocoons, as follows:—June 1st, two; 16th, one; 23rd, one; July 2nd, one; 15th, one; 25th, one; August 4th, one; 17th, one. The ovum-cocoon is constructed after the following manner: The acetabuliform receptacle of fluffy silk\* is first made, which, as is usual with this species, is attached to

\* This is formed by the spinnerets being raised up and down.

the under side of the web, into which a number of ova are exuded, this act occupying about five minutes. After resting awhile the Spider begins moving round the egg-mass, touching lightly here and there with the spinnerets. In a short while a globular cocoon is formed, about the same size as that made by *Dolomedes mirabilis*, viz. about one-third of an inch. The ova are pale yellow; the ovum-cocoon is, when freshly made, white, but after awhile becomes brownish. In the natural state the cocoon is often covered with rubbish, viz. the remains of insects, &c. The ova are hatched in about forty-five to fifty days.  
T. EDWARD BELCHER (24, Clephane Road, Canonbury, N.).

#### BIBLIOGRAPHY.

**Proposed General Index to 'The Zoologist.'**—Of recent years I have had occasion to continually refer to many of the old volumes of 'The Zoologist.' In so doing I have found that the absence of a continuous index is a great drawback. Each yearly volume has been indexed separately, but there is no index to the whole series, which now consists of over sixty volumes. To find a reference by hunting through all the yearly indexes is a work which entails great labour and much loss of time and temper. Moreover, the indexes of some of the earlier volumes are not so full as could be desired, and require a considerable amount of revision. It therefore seems to me that the time has arrived for the publication of an entirely new index to the first sixty volumes of 'The Zoologist,' i.e. 1843 to 1902, and I am writing this letter with the object of ascertaining to what extent my view on this matter is shared in by readers of 'The Zoologist' and students of natural history. The question what form the index should take is a subject on which I should be glad to have some expression of opinion. It has occurred to me that the best method would be to have an index of subjects—for instance, an index containing all the references to birds might be first published, and might be followed by other volumes on mammals, fishes, insects, &c. The method I suggest for compiling the index may be seen from the following examples, which I have taken from the volumes for 1843, 1844, 1845. As the numbering of the sixty volumes of 'The Zoologist' from 1843 to 1902 is not continuous, the references, I think, ought to be indexed not under the heading of the volume, but of the year. A few specimen headings are subjoined:—

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I should be very glad to receive expressions of opinion from readers of 'The Zoologist' on the following points:—1. Is such an index needed, and is it likely to receive a sufficient amount of support to warrant its publication? 2. Is the division of the index into subjects advisable?

WATKIN WATKINS (3, Paper Buildings, E.C.).

**Birds of the Isle of Man.**—Since my former request for information on this subject a considerable amount of interesting matter has been acquired, but before the work, which is now nearly ready, is placed in the publisher's hands, I should be glad to receive any further notes, which will be duly acknowledged. Information is particularly desired with regard to the following:—Whinchat, Garden-Warbler, Lesser Whitethroat, Wood-Warbler, Dipper, Twite, Merlin, Rock-Dove, the species of Grey Geese, and sea-frequenting Ducks.—P. G. RALFE (Castletown, Isle of Man).

## NOTICES OF NEW BOOKS.

*The Direction of Hair in Animals and Man.* By WALTER KIDD, M.D., F.Z.S. Adam & Charles Black.

THIS book constitutes a renewed assertion, with fuller argument, and the addition of new facts, to the views of the author originally promulgated in a volume entitled 'Use-Inheritance,' &c. (cf. Zool. 1901, p. 433). Dr. Kidd is a Darwinian evolutionist, but, with many other thinkers, admits a strong Lamarckian factor as opposed to the views of the Exclusive Selectionist, the Neo-Darwinian, or the pure apostle of Weismannism. He describes with minute scrutiny the nature and direction of the hair on mammals, including man, regards "use-inheritance" as proved, and evidence for the view that acquired characters can be inherited, and is thus outside the circle of the dominant school in evolution. Nevertheless, though this book can of course be ignored, its arguments cannot be suppressed, and it is well to protect Darwinism from being first revised by the neologist, and then promulgated as an infallible doctrine.

In our notice of the preliminary publication we have referred to many of the facts relied on by Dr. Kidd, and which need not now be repeated. After seeking for an explanation of the phenomena by the arguments of Creation, Selection, or Use and Habit, he accepts the last theory, which he states "is equivalent to a mechanical view of the production of hair direction, and must be resolved into certain component parts and diverse forces. These are Pressure, Gravity, and Underlying Divergent Muscular Traction." We may subsequently gauge the trend of his opinion when discussing the direction of the hairs on the Orang. On the arm and forearm of this animal the long reddish hair slopes towards and beyond the point of the elbow, where it shows longer hair in this part than any other Anthropoid Ape, and this, it has been suggested, provides a thatch for running off the rain. Our author here remarks : "The selectionist would say it is produced *for* the rain to flow over easily. I would suggest that it is produced *by* the rain flowing over it"; and here the Neo-Darwinian will at once scent the noxious heresy of Lamarckism.

As clearness of expression is so absolutely required in this discussion—and Dr. Kidd, in reference to man, is not afraid to write of his "hairy, arboreal, ape-like ancestors"—we would suggest that the words in his title "Animals and Man" might have been better expressed as "Man and other Animals."

